

- 8. 10. 2001

(54)

TH 1549 PCTN E W C L A I M S

1. A nozzle for use in a fluid catalytic cracking unit comprising:

a first conduit for providing a passageway for enabling a first dispersing gas to flow therethrough;

5 a first cap covering the end of said first conduit, said first cap including at least one outlet passageway therethrough adapted for discharging said first dispersing gas into a liquid hydrocarbon feed material;

10 a second conduit enclosing said first conduit and spaced therefrom to form an annulus therebetween thereby providing a passageway for enabling said liquid hydrocarbon feed material to flow therethrough;

15 a second cap covering the end of said second conduit, said second cap being spaced from said first cap thereby forming a mixing zone therebetween for mixing said liquid hydrocarbon feed and said first dispersing gas said and said second cap including at least one circular slot as outlet passageway therethrough, which passageway is substantially aligned
20 with the outlet passageway on said first cap and is adapted for discharging said mixture of said liquid hydrocarbon feed and said first dispersing gas, and wherein a third conduit is present surrounding said second conduit and forming an annulus therebetween for
25 providing a passageway for enabling a second dispersing gas to flow therethrough.

2. The nozzle of claim 1, wherein said circular slot includes a chamfer.

Art. 34

3. The nozzle of claim 3, wherein the chamfer has an angle between 0° and 10° with the outlet passageway.

4. The nozzle of any one of claims 1-3, wherein the outlet passageway through said second cap is adapted to discharge said mixture of said liquid hydrocarbon feed and said first dispersing gas in a generally radial outward and upward direction.

5. The nozzle of claim 4, wherein said upward discharge angle is in the range of about 20° to 80° from the axis of said nozzle.

6. The nozzle of any one of claims 1-5, wherein the outlet passageway on said first cap includes a plurality of outlet passageways for discharging said first dispersing gas into said liquid hydrocarbon feed material to form a mixture thereof, and the circular slot outlet passageway on said second cap includes a plurality of outlet passageways adapted for discharging said mixture of said liquid hydrocarbon feed and said first dispersing gas in multiple fan sprays and in a generally radial outward and upward direction.

7. The nozzle of any one of claims 1-5, wherein the outlet passageway on said first cap includes a plurality of outlet passageways for discharging said first dispersing gas into said liquid hydrocarbon feed material to form a mixture thereof, and the circular slot outlet passageway on said second cap is open along its entire circumference, adapted for discharging said mixture of said liquid hydrocarbon feed and the first dispersing gas in a single fan spray and in a generally radial outward and upward direction.

8. The nozzle according to any one of claims 1-7, wherein said second cap includes a conical surface which includes the circular slot outlet passageway and said

Art. 34

first cap includes a conical surface having at least one outlet passageway.

9. The nozzle of any one of claims 1-8, wherein the outlet passageway through said first cap includes a plurality of substantially round holes.

10. The nozzle of any one of claims 1-9, wherein a passageway is present for enabling part of the liquid hydrocarbon feed material to be discharged in a more central position, between the first cap and second cap, relative to the position of the outlet passageway of said first cap.

11. A fluid catalytic cracking unit comprising:

at least one riser reactor;

at least one nozzle located in the bottom of said riser according to any one of claims 1-10 and a regenerator standpipe through which hot regenerated catalyst enters the riser bottom region.

12. The fluid catalytic cracking unit of claim 11 wherein the third conduit of the feed nozzle terminates at a point above the level of the centerline of said standpipe entering the riser.

13. Use of a fluid catalytic cracking unit of any one of claims 11-12 in a process to catalytically convert a hydrocarbon feed.

14. A method of injecting feed into a fluid catalytic cracking unit comprising the steps of:

introducing a liquid hydrocarbon feed and a dispersing gas into a feed nozzle according to any one of claims 1-10 in the bottom of a riser;

mixing said liquid hydrocarbon feed and said dispersing gas in a mixing zone in said feed injection system; and

ADD $A_1 >$

[illegible]

AMENDED SHEET